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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,914	01/26/2004	Andreas Sibrai	DS03-005B	3363

7590 03/08/2005  
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EXAMINER
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NGUYEN, HIEP

ART UNIT	PAPER NUMBER
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2816

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/764,914	<b>Applicant(s)</b> SIBRAI ET AL.	
	<b>Examiner</b> Hiep Nguyen	<b>Art Unit</b> 2816	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02-25-04, 9/23/04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Claim Objections***

Claim 10 is objected to because of the following informalities: the recitation “the output reference signal” in claim 10, “said set of reference value” in claim 31 do not have antecedent basis. Claim 8 is objected to because the limitation “the typical gain “ is not a positive recitation. Appropriate correction is required

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Correction and/or clarification is required.

Regarding claim 1, the recitation “means for a set of...” in lines 4, 5, 9 are indefinite because it is not clear what it is meant by. The same rationale is true for claims 17, 26, 29, 33, 43, 47 and 50. The recitations “ means for linearly control the switching function for each of said set of continuous switching devices” on lines 7-8 and “ means for a set of translinear amplifier stages to produce said linear controls for said switching function” on lines 9-10 are indefinite for the following reasons:

1. If the switches are continuously activated (constantly on or off), there will be no further control of capacitance;

2. Figure 9 of the present application shows that the “ means for a set of translinear amplifiers stages” controls the switching devices. The “means to linearly control the switching function for each of said set of continuous switching devices” also controls the switching device. Therefore, it is not clear as to these two means are the same or different from each other. The recitation “ means to provide a signal, dependent on the tuning voltage” on lines 13 is indefinite because it is confusing. It is not clear as to this “means to provide a signal” is the same or different than the “means to linearly control the switching function...”

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and the “set of translinear amplifier stages”. These three means perform the same function that is controlling the switching devices for changing the capacitance. Clear explanation is required. The recitation “means to provide a signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, to all of said translinear amplifier stages” on lines 13-15 is indefinite because it is misdescriptive. Figure 9 of the present application shows that the “tuning voltage “ (Vtune) is applied directly to the amplifier. The “means to provide a signal, dependent on the tuning voltage (Vtune)” is not seen in the drawing. The same rationale is applied to the claims 17, 26, 29, 33, 43, 47 and 50.

Regarding claim 9, the recitation “means to provide a signal, dependent on the tuning voltage” has the same 112, 2<sup>nd</sup> problem of claim 1. This “means” is not shown in the drawing.

Regarding claims 17 the recitation “means for linearly control the switching function for each of said set of continuous switching devices” on lines 8-9, “means to drive said switching device” on line 11 and “means for a set of translinear amplifier stages to produce said linear controls for said switching function” on lines 17 are confusing because these three different means perform a same function that is controlling the switches. The recitation “means to provide a signal, dependent on the tuning voltage” on line 21 is misdescriptive because the tuning voltage (Vtune) is directly connected to the inputs of the amplifiers and there is no other signal seen to be dependent on signal (Vtune).

Regarding claims 18 and 19, the recitation “when said switching device is outside its dedicated active working area on the lower resistance side ” on lines 2-3 is indefinite because it is not clear what “outside its dedicated active working area on the lower resistance side ” is meant by. The recitation “additional circuit elements working as a signal-limiting function” on lines 3-4 is indefinite because the “additional circuit elements working as a signal-limiting function” is not seen in the drawing.

Regarding claims 20 and 21, the recitation “said signal-limiting function to drive said switching device to a fully on status” is indefinite because it is not clear what is the “said signal-limiting function” and how this “signal-limiting function” is “incorporated” to what element in order “drive said switching device to a fully on status”. The recitation ““outside its dedicated active working area on the lower resistance side ” has the same 112, 2<sup>nd</sup> is indefinite because it is not clear what the “outside its dedicated active working area” is meant by. The

recitation “ **are implemented within the translinear amplifier circuit**” is indefinite because it not what it is meant by. Clear explanation is required. The Applicant is requested to explain what is the status of the switching device in the recitation “when said switching device is **outside its dedicated working area on the lower resistance side**” (i.e. on, off, tri-state etc...).

Regarding claim 24, the recitation “ discrete capacitor components” is indefinite because it is misdescriptive. By definition a discrete component is a component that has been fabricated **prior to** its installation. The capacitors in the claimed IC circuit cannot be discrete components as recited.

Regarding claim 26, the recitations “means to linearly control the switching function for each of said set of continuous switching devices” on lines 8-9 and “ means for a set of translinear amplifiers stages to produce said linear controls for said switching functions” are confusing because these two different “means” perform the same function that is controlling the switches. Therefore, it is not clear as to these two means are the same or different from each other. The recitation “ means to provide a signal, dependent on the tuning voltage” on lines 15 is indefinite because it is confusing. It is not clear as to this “means to provide a signal” is the same or different than the “means to linearly control the switching function...” and the “ set of translinear amplifier stages”. These three “means” perform the same function that is controlling the switching devices for changing the capacitance. Clear explanation is required.

Regarding claim 29, the recitation “ A circuit to control the capacitance of a variable capacitor in a steady mode, but with predefined non-linear relation to the tuning voltage, through a steady tuning voltage...” on lines 1-3 is indefinite because it is not clear what the “steady mode” and “through a steady tuning voltage” are meant by. When the capacitor is in “steady mode” (constant) and the tuning voltage is **steady** (constant), there is no further control required.

The recitation “ means to provide a non-linear relation between said tuning voltage and said threshold points” on lines 16-17 is indefinite because it not clear what is the “means”. It is clear that the thresholds are **fixed** and set by the resistors thus, the “tuning voltage” (V<sub>tune</sub>) is a value that is not related to the threshold voltages. It is not clear how this means can “provide a non-linear relation between said tuning voltage (V<sub>tune</sub>) and “said fixed threshold

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points". The recitations " means to linearly control the switching function for each set of continuous switching device" on lines 8-9 and " means for a set of translinear amplifier stage to produce said linear controls for said switching devices" on lines 10-11 are indefinite because it is not clear as to the two above "means" are the same or different from each other since they both control the switching devices. The recitation "means to provide a signal dependent on the tuning voltage dedicated for the voltage controlled capacitance change" on lines 15-17 is indefinite because it is not clear what this "means" is and how this "a signal" is dependent on the tuning voltage (Vtune). Figure 9 of the present application shows that the tuning voltage (Vtune) is an "isolate" signal that is input directly to the amplifier. This tuning voltage is not coupled to any "means" to generate "a signal" that is dependent on the tuning signal (Vtune) as recited. The Applicant is requested to point out in the drawing the " a means to provide a signal". The same rationale is true for the recitation "means to provide a signal dependent on the tuning voltage dedicated for the voltage controlled capacitance change" in claims 33, 43, 47 and 50. The recitation "the tuning voltage" on line 2 does not have antecedent basis.

Regarding claim 31, the recitation "means to provide a non-linear relation between said tuning voltage and said threshold points is provided... in a way, to achieve said desired non-linear relation" on lines 1-4 is indefinite because it is not what is this means and how this means can "provide a non-linear relation between said tuning voltage and said threshold points". Claim 31 is also misdescriptive because figure 9 of the present application shows no means for selecting "steps up of said set of reference values (?)" to "achieve said desired non-linear relation". The recitation "said set of reference values" does not have antecedent basis.

Regarding claim 43-46, the recitations " when said switching device is outside its dedicated working area on the lower resistance side" (lines 10-11) and " when said switching device is beyond its dedicated working area on the higher resistance side" (lines 12-13) are indefinite because they are confusing. The Applicant is requested to explain what is the status of the switching device in these recitations (i.e. on, off, tri-state etc.) when the switch is outside/beyond it's dedicated working area on the lower/higher resistance side. The recitation "When said switching device is in its dedicated active working area" (lines 22-23) is indefinite because it is not clear what "dedicated **active** working area on the lower resistance

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side” is meant by. The recitations “outside its dedicated active working area” (line 25) and “beyond its dedicated active working area on the higher resistance side” (line 25) are indefinite because they do not make sense. Clear explanation is required.

Regarding claim 47, the recitations “means for a set of translinear amplifier” (lines 6-7) and “means to linearly control” (line 8) are indefinite because it is not clear as to they are the same means or different means since they both control the switch. The recitation “ means to provide a signal a signal, **dependent on the tuning voltage** ... to all of said translinear amplifier stage” on lines 11-13 is indefinite because it is misdescriptive. Figure 9 of the present application shows that the “tuning voltage” (Vtune) is applied directly to the amplifier. The “ means to provide a signal, **dependent on the tuning voltage** “ (Vtune) is not seen in the drawing.

Regarding claim 50, the recitation “means to provide a signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, to all of said translinear amplifier stages” on lines 9-11 and “ supplying a signal, **dependent on the tuning voltage**” on line 22 are indefinite because it is misdescriptive. Figure 9 of the present application shows that the “tuning voltage” (Vtune) is applied directly to the amplifier. The “ means to provide a signal, dependent on the tuning voltage “ (Vtune) is not seen in the drawing. The recitation “ providing a non-linear relation between said tuning voltage and said threshold points” on lines 25-26 is indefinite misdescriptive. It is clear that the thresholds are fixed and set by the resistors and the “tuning voltage” (Vtune) is a value that is not related to the threshold voltages. It is not clear how the circuit can “provide a non-linear relation between said tuning voltage (Vtune) and “said threshold points” as recited. The same rationale is applied to claim 52.

Regarding claim 52, the recitation “ providing a non-linear relation between said tuning voltage and said threshold points” on lines 1-2 is indefinite because it misdescriptive. It is clear that the thresholds are set by the resistors and the “tuning voltage” (Vtune) is a value that is not related to the threshold voltages thus, it is not clear how the circuit can “provide a non-linear relation between said tuning voltage (Vtune) and said threshold points” as recited.

Claims 2-8, 10-16, 22, 23, 25, 27, 28, 30, 32, 34-42, 47-49 are indefinite because of the technical deficiencies of claims 1, 17, 26, 29, 33, 43, 47 and 50.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6, 8, 9, 11, 14, 17-21, 23, 24, 29-47 and 50-52 are rejected under 35 U.S.C. 102 (e) as being anticipated by Liu (US Pat. 6,577,180).

Regarding claim 1, figure 3 of Liu shows a circuit to control the capacitance of a variable capacitor in a linear mode through a steady tuning voltage to achieve a high Q factor at the same time comprising: a set of small capacitors and a set of switches (60) that is turned on/off depending on the control signals, translinear amplifiers (50), means for individually provide the threshold points (40), means for providing a signal (Vref) depending on the tuning voltage for controlling the capacitance. Note that the “tuning voltage” (Vref) varies with the variation of the supply voltage (Vcc) (col. 2, lines 56-64). The resistor (Rref) installed outside of the IC senses the change of the supply voltage and the tuning voltage (Vref) is compared with the threshold voltages for generating control voltage for the switching devices (col. 2 lines 56-64; col. 4 lines 10-24; col. 7, lines 37-41). Amplifier circuit (50) converts signal from circuit (40) based on the “tuning voltage” (Vref) to control the correction circuit (60) that comprises parallel connected capacitors thus, the capacitance of the variable capacitor varies in a linear mode depending on the value of the amplifier circuit (50) outputs.

Regarding claims 2-4, the switching devices are MOSFETs.

Regarding claims 5, 6, 8, 9 and 11, the thresholds are provided individually by circuit (40) comprising resistive components. The gain of the translinear amplifiers (50) is different from 1. The “tuning voltage” is signal (Vref). The capacitors in figure 3 are discrete capacitors.



Regarding claim 14, it is inherent that in an IC circuit, the components are fabricated on a same substrate.

Regarding claims 17, figure 3 of Liu shows a circuit to control the capacitance of a variable capacitor in a strictly linear mode through a steady tuning voltage to achieve a high Q factor at the same time comprising: a set of small capacitors and a set of switches (60) that is turned on/off depending on the control signals, translinear amplifiers (50), means for individually provide the threshold points (40), means for providing a signal ( $V_{ref}$ ) depending on the tuning voltage for controlling the capacitance. Note that the “tuning voltage” ( $V_{ref}$ ) varies with the supply voltage ( $V_{cc}$ ). The resistor ( $R_{ref}$ ) installed outside of the IC senses the change of the supply voltage and the tuning voltage is compared with the threshold voltages for generating control voltage for the switching devices (col. 2 lines 56-64; col. 4 lines 10-24; col. 7, lines 37-41). Amplifier converts signal from circuit (40) based on the “tuning voltage”  $V_{ref}$  to control the correction circuit (60) that comprises parallel connected capacitors thus, the capacitance of the variable capacitor varies in a linear mode depending on the value of the control voltage output from circuit (50)..

Regarding claims 18-21, it is inherent that when the switch is turned on, the “working area” of the transistor has a low resistance and when the switch is turned off, the “working area” of the transistor has a high resistance.

Regarding claim 23, the translinear amplifiers (50) have gains different from 1.

Regarding claim 24, the capacitors and the amplifier can be fabricated in the same substrate or the capacitors can be produced in different substrate (“discrete” capacitors).

Regarding claims 29-32 figure 3 of Liu shows a circuit to control the capacitance of a variable capacitor comprising: a set of small capacitors and a set of switches (60) that is turned on/off depending on the control signals, translinear amplifiers (50), means for individually provide the threshold points (40), means for providing a signal ( $V_{ref}$ ) depending on the tuning voltage for controlling the capacitance. Note that the “tuning voltage” ( $V_{ref}$ ) varies with the supply voltage ( $V_{cc}$ ). The resistor ( $R_{ref}$ ) installed outside of the IC senses the change of the supply voltage and the tuning voltage is compared with the threshold voltages for generating control voltage for the switching devices (col. 2 lines 56-64; col. 4 lines 10-24; col. 7, lines 37-41). Circuit (50) converts signal from circuit (40) based on the “tuning

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voltage"  $V_{ref}$  to control the correction circuit (60) that comprises parallel connected capacitors thus, the capacitance of the variable capacitor varies in a linear mode depending on the value of the control voltage output from circuit (50). The tuning voltage ( $V_{ref}$ ) and the threshold voltage generated by the voltage divider are in non-linear relation. Each threshold value is for each capacitor. Circuit (40) generates reference values.

Regarding claims 33, 34, 43-47 and 50-52, figure 3 of Liu shows a method to control the capacitance of a variable capacitor comprising providing: small capacitors, switching devices, transamplifier stages (50), signal for controlling capacitance change ( $V_{ref}$ ). The switches are continually switched depending on the values of signal ( $V_{ref}$ ). The switches are turned on fully or turned off fully. The threshold voltages are set for each capacitor.

Regarding claims 34-36, the switches are MOSFET transistors.

Regarding claims 37, 38, 39, 41 and 42, the reference values are generated by element (40) comprising resistors. Capacitors are connected in parallel. The single signal connected to the amplifiers is signal ( $V_{ref}$ ).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-9, 12-16, 22, 25 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US Pat. 6,577,180).

Figure 3 of Liu includes all the limitations of claims 8, 9, 22 and 23 except for the limitation that the gain of the amplifier is 1 (claim 8). However, it is old and well known to one having skill in the art that depending on the "load", the gain of an amplifier can be low (1) or higher than 1. Therefore, it would have been obvious to one having skill in the art to select a gain for an amplifier equal to unity or higher than unity for properly driving a load.

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Regarding claims 12-16, 25 and 40, figure 3 of Liu includes all the limitations of claim 12 except for the limitation that the capacitors are manufactured on a planar carrier. However, it is old and well known to one having skill in the art that the electrical circuits are produced on a planar carrier (US Pat. 4,730,095) for providing highly precise and extremely economical circuits (Abstract). It is obvious that for packaging purpose, the components of a large circuit can be produced on separate substrates or on a same substrate. It is old and well known for one having skills in the art that a capacitor can be formed using MOS transistor (metal-oxide structure) or by using BJT transistor (a junction capacitor).

#### ***Allowable Subject Matter***

Claims 10, 48 and 49 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claims 26-28 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.



#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hiep Nguyen whose telephone number is (571) 272-1752. The examiner can normally be reached on Monday to Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Callahan can be reached on (571) 272-1740. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hiep Nguyen

03-02-05  
  
MY-TRANG NUTON  
PRIMARY EXAMINER  
3/2/05